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## Observations on the birds of Cosmoledo Atoll, Seychelles

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*Received 23 December 1998*

Although Cosmoledo Atoll, Aldabra group, is recognized as an "Important Bird Area" by BirdLife International (Rocamora & Skerrett, in press), its avifauna has been poorly studied. Most published reports are based on short visits to only some of the more than 15 islands in the group (Fig. 1)—October 1878 (Rivers 1878), 9–12 October 1901 (H. A'C. Bergne, reported by Benson (1970)), 14–19 September 1907 (Dupont 1907), October 1937 (Vesey-Fitzgerald 1940, 1941), 5–6 October 1967 (Parker 1970), 6 March 1968 (Benson 1970), 6 March & 14 September 1968 (Bayne *et al.* 1970), 13 February 1970 (Gillham 1977), 12–13 April 1996 (Skerrett 1996). The total land area is approximately 5.2 km<sup>2</sup>, or 3.4% of that of the whole atoll (Bayne *et al.* 1970). This remote atoll (Fig. 2) has been continuously exploited for birds, turtles, fish, and guano since at least the mid-1800s. The composition of the resident avifauna has been incompletely described in the literature, and the recent status of the various bird species is poorly documented. Our study reports observations we made during visits to the atoll on 7–13 December 1996 and 23–25 April 1997, discussed from the perspective of our collective long term residence on Cosmoledo (eight visits by JAM since 1981, including five months residence (January–May) in

1982 while studying sea turtles, and 10 years residence by AC since 1956 while working as fisherman and island manager). We focused particularly on the seabirds. Island names accord with those listed in the Constitution of the Republic of Seychelles (1992). In some cases, however, these differ from the more commonly used Kreol names or names found on older nautical charts (e.g. British Admiralty Chart 61301). To avoid confusion, all the names for each island are indicated in Fig. 1. The following accounts refer to species records from Cosmoledo Atoll unless stated otherwise.

#### AUDUBON'S SHEARWATER *Puffinus lherminieri*

In recent decades sometimes heard at night on Grand Ile and Menai (Bayne *et al.* 1970, AC pers. obs.), but not seen nesting. The possibility that it occurs on smaller islands, rarely visited at night, warrants investigation. This may have been the "Fouquet" reported by Rivers (1878).

#### RED-TAILED TROPICBIRD *Phaethon rubricauda*

Some 15 nests seen on Pti Astove on 25 April 1997. Also nests abundantly on other small rocky islets just east of Menai (including Ilot Lacroix, Ile aux Rats, Ile aux

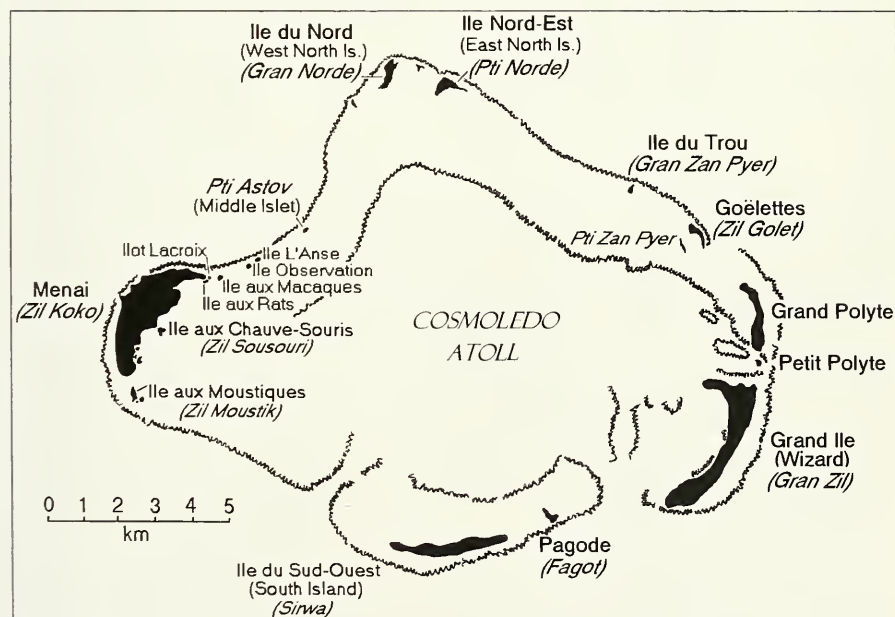


Figure 1. Map of Cosmoledo Atoll. All known names for each island are indicated, with the first being the official name recorded in the Constitution of the Republic of Seychelles (1992) or, for islands not listed in the Constitution, the most commonly used vernacular name. Alternate names are denoted by parenthesis; Kreol names are in italics.

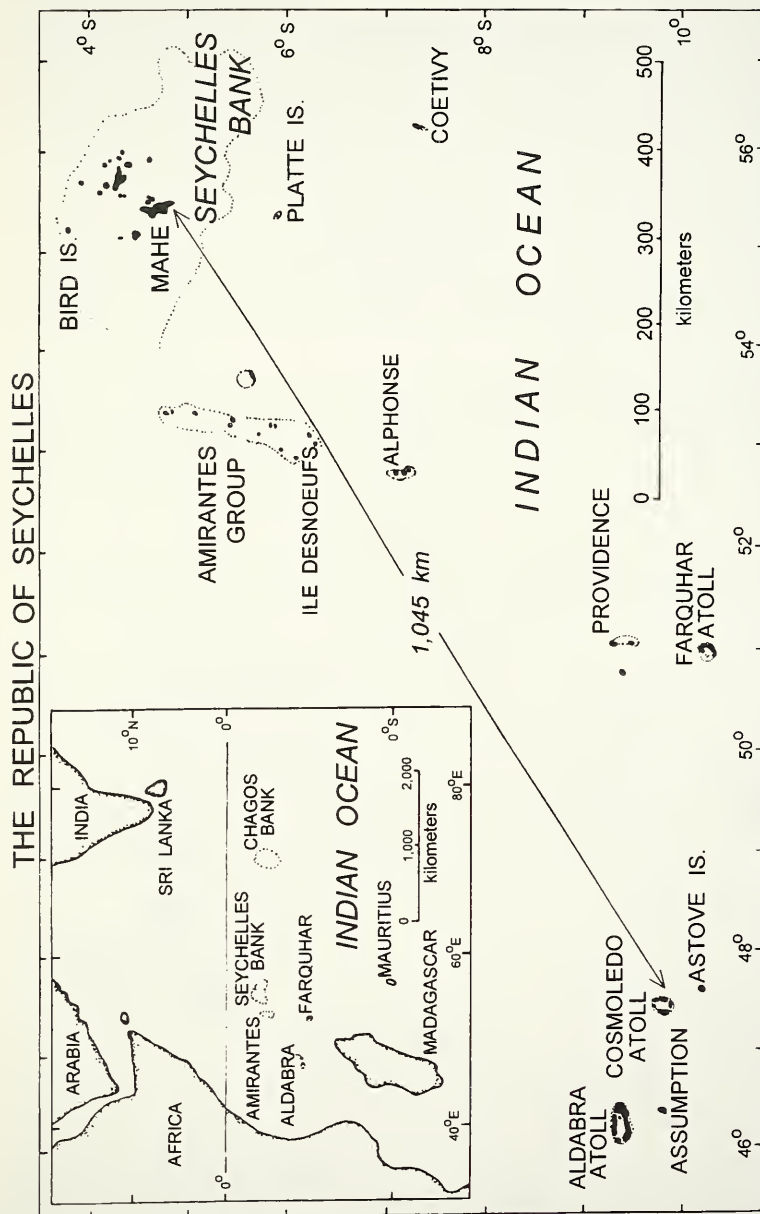


Figure 2. Map of the Republic of Seychelles showing its position in the Indian Ocean, and the location of Cosmoledo Atoll relative to Mahe (the most populated island) and other important islands of Seychelles.

Macaque, and Ile L'Anse (Skerrett 1996)), regularly on Grand Ile (where their offspring are killed by cats), and less abundantly on Pagode (Gillham 1977), Ile du Nord, Ile Nord-Est and Grand Polyte islands. Nesting first reported by Vesey-Fitzgerald (1941).

#### **WHITE-TAILED TROPICBIRD** *Phaethon lepturus*

No nesting records, but individual sightings by Bayne *et al.* (1970) and Skerrett (1996).

#### **MASKED OR BLUE-FACED BOOBY** *Sula dactylatra*

Nesting birds with eggs (usually 1–2 per nest, but one with 3), as well as chicks of all sizes, including some larger than the parents, were recorded by us in December 1996. Nesting was most concentrated on Ile du Sud-Ouest and Pagode, less so at Goëlettes, Ile Nord-Est, and Ile du Nord (occurring mostly at the north and south ends of that island), and scarce or lacking at Grand Polyte, Petit Polyte, Grand Ile, Ile du Trou, Ile aux Chauve-Souris, and Menai. In contrast, Diamond (in Bayne *et al.* 1970) counted >200 pairs of *S. dactylatra* nesting on Grand Ile in March 1968. In April 1996, Skerrett estimated a total of 5,000–6,000 breeding pairs on the atoll (Rocamora & Skerrett in press) with 5,000 on Ile du Sud-Ouest, 300 on Pagode, 100 on Goëlettes and 30 on Ile du Trou (Skerrett 1996). Previous Cosmoledo records include those by Vesey-Fitzgerald (1941), Parker (1970), and Gillham (1977). *S. dactylatra* was probably one of the three (unidentified) species of booby noted by Rivers (1878).

#### **RED-FOOTED BOOBY** *Sula sula*

This, the most abundant booby species, was nesting in December 1996 in greatest density on Ile du Sud-Ouest, Pagode, Ile du Trou, and Sousouri. Scattered nesting occurred on Menai (in the mangroves), Ile du Nord, and Goëlettes, but was notably sparse on Grand Polyte and Petit Polyte, where it had been dense in 1982 (JAM and AC pers. obs.). As in 1982, we found no nesting on Grand Ile or Ile Moustique. In contrast, in March 1968, Bayne *et al.* (1970) reported “well in excess of 150 pairs” on Grand Ile. During his visit on 12–13 April 1996, Skerrett estimated total breeding pairs on the atoll to number some 10,000–12,000 (Rocamora & Skerrett in press) with 10,000 on Ile du Sud-Ouest, 500 on Pagode, 500 on Ile du Nord, 300 on Ile Nord-Est, and 200 on Goëlettes. *S. sula* was previously reported by Vesey-Fitzgerald (1941), Parker (1970), and Gillham (1977), and is probably one of the three types of booby mentioned by Rivers (1878).

#### **BROWN BOOBY** *Sula leucogaster*

No reliable published accounts could be found of this species at Cosmoledo. In December 1996, we observed nesting on Ile du Nord (two adults and a juvenile), and on Ile du Sud-Ouest (five adults, a small white chick, and one juvenile). During the past three decades nesting was also seen at Pagode, Goëlettes, and Ile Nord-Est, but not on the other islands (Menai, Ile aux Chauve-Souris, Grand Polyte, Petit Polyte,

Grand Ile, or Ile du Trou) (AC per. obs.). The species was more abundant in the past, but has always been relatively rare (AC pers. obs.). The reference to a collected specimen in both Bayne *et al.* (1970) and Parker (1970) was in fact a misidentified immature *S. dactylatra* (Diamond 1981). River's (1878) account does not clearly identify *S. leucogaster* as one of the three booby species he reported, which led Diamond (1981) to suggest that he may have either confused immature *S. dactylatra* with a third species of booby, or sighted the Abbott's Booby *Sula abbotti*, formerly known to occur on Assumption (Fig. 2).

**GREAT FRIGATEBIRD** *Fregata minor* and **LESSER FRIGATEBIRD** *F. ariel*  
Both *F. minor* and *F. ariel* occur in relatively large numbers (at least several hundred birds) and kleptoparasitise food from the boobies. Gillham (1977) reported *F. minor* as most abundant. Vesey-Fitzgerald (1941) reported nesting by both species on islets in the lagoon. In December 1996, we surveyed all the islands on the north, east and south sides of the atoll but encountered breeding only on Ile du Sud-Ouest where we found a half dozen nests containing juveniles, later identified from our photographs as *F. minor* by A. Skerrett. We did not, however, visit the mangroves on Menai where significant numbers of frigatebirds used to nest (AC pers. obs.). The current status of both the Menai rookery and *F. ariel* is therefore unknown.

**CATTLE EGRET** *Bubulcus ibis*

Encountered by us on most islands in December 1996, it was also reported by Benson (1970), Parker (1970), Bayne *et al.* (1970), Gillham (1977), and Skerrett (1996).

**GREEN-BACKED HERON** *Butorides striatus*

Reported by Benson (1970), Parker (1970), Bayne *et al.* (1970), Gillham (1977), and Skerrett (1996).

**DIMORPHIC EGRET** *Egretta dimorpha*

Encountered by us at most islands and along the perimeter of the lagoon during all seasons; also reported by Parker (1970), Benson (1970), Bayne *et al.* (1970), Gillham (1977), and Skerrett (1996).

**GREY HERON** *Ardea cinerea*

Nests most abundantly at Ile aux Moustiques, but also on all the islets north of Menai, on Ile du Nord, Ile Nord-Est, Ile du Trou, and Petit Polyte (AC pers. obs.), as well as at Ile Goëlettes (Skerrett 1996) and Ile du Sud-Ouest (Skerrett, pers. comm.). Earlier sightings were made by Parker (1970), Bayne *et al.* (1970), and Gillham (1977).

**WHITE-THROATED RAIL** *Dryolimnas cuvieri*

The species was first recorded in 1878 by Rivers (1878), and last sighted in 1907 at Ile du Sud-Ouest by Dupont (as reported by Benson (1970)). Extinction was confirmed in 1981 (Mortimer 1984b).

**CRAB PLOVER** *Dromas ardeola*

We observed large flocks numbering some 500 birds at the perimeter of the lagoon in December 1996. Other sightings reported by Dupont (1907), Parker (1970), Benson (1970), Gillham (1977).

**GREY PLOVER** *Pluvialis squatarola*

Reported by Parker (1970), Benson (1970) and Skerrett (1996).

**LESSER SANDPLOVER** *Charadrius mongolus*

Recorded in April 1996 by A. Skerrett (pers. comm.).

**GREATER SANDPLOVER** *Charadrius leschenaultii*

Reported by Parker (1970), Benson (1970), Gillham (1977), and Skerrett (1996).

**BAR-TAILED GODWIT** *Limosa lapponica*

Reported by Benson (1970).

**WHIMBREL** *Numenius phaeopus*

Reported by Parker (1970), Benson (1970), Gillham (1977) and Skerrett (1996).

**SLENDER-BILLED CURLEW** *Numenius tenuirostris*

Reported by Gretton (1991).

**GREENSHANK** *Tringa nebularia*

Reported by Benson (1970).

**COMMON SANDPIPER** *Actitis hypoleucos*

Recorded by Dupont (1907) and Parker (1970).

**TURNSTONE** *Arenaria interpres*

Regularly encountered in December 1996 along all shorelines, it was also reported by Dupont (1907), Parker (1970), Benson (1970), Gillham (1977), and Skerrett (1996).

**SANDERLING** *Calidris alba*

Reported by Parker (1970), Benson (1970), Gillham (1977), and Skerrett (1996).

**CURLEW SANDPIPER** *Calidris ferruginea*

Reported by Parker (1970), Benson (1970), and Gillham (1977).

**CASPIAN TERN** *Hydroprogne caspia*

Regularly seen feeding in shallow water in December 1996; also reported by Vesey-Fitzgerald (1941). The possibility that it breeds at Cosmoledo as on neighbouring Aldabra (Diamond & Prŷs-Jones 1986) warrants investigation.

**BLACK-NAPED TERN** *Sterna sumatrana*

Regularly encountered along shorelines in December 1996; previously reported by Bayne *et al.* (1970), Gillham (1977) and Skerrett (1996). May breed at Cosmoledo (A. Skerrett 1996) as on Aldabra (Diamond & Prŷs-Jones 1986).

**BRIDLED TERN** *Sterna anaethetus*

Several adults seen on two small islets along north-west coast of Ile du Sud-Ouest (in December 1996), also on islets near Ile aux Moustiques where nesting was observed (by AC) in the late 1980s. Rivers (1878) reported its occurrence in 1878. Vesey-Fitzgerald (1941) reported eggs on lagoon islets in October 1937.

**SOOTY TERN** *Sterna fuscata*

Nests annually in large numbers over most of Grand Ile, but especially on the flat sandy plain, during the south-east monsoon. The nesting season, usually June to August, is consistent with that documented for *S. fuscata* elsewhere in Seychelles (see review by Diamond & Prŷs-Jones (1986)). During his brief visit to Grand Ile in 1967, Parker (1970) observed that all the young birds had fledged by 5 October. In December 1996, we found carcasses of dead *S. fuscata* from the 1996 nesting season, but no live birds.

Although residents of the atoll have annually (during periods of human occupation) collected many hundreds of eggs for local consumption, the distance between Cosmoledo and Mahe precluded the import of large quantities of fresh eggs to Mahe from the atoll. Thus, no records were kept of egg production. In fact, fresh eggs were systematically harvested for export to Mahe during only two seasons (1990 and 1991) (Justin Moutache (IDC) pers. comm.). During those seasons a reserve from which no eggs were harvested was established in the sand dunes of Grand Ile (E. G. Smith *in litt.* to C. Feare, 6 March 1991; N. J. Shah *in litt.* to P. Mathiot, 24 June 1991), and the breeding population comprised an estimated two million birds (E. G. Smith *in litt.* to C. Feare, 6 March 1991). This figure was corroborated by egg collectors (AC and Peter Volcere, pers. comm.) who, having harvested eggs at both sites, agreed that the breeding population on Cosmoledo was more than twice that of Desnoeufts, which has been estimated by Feare & Gill (1996) to number some 360,000 to 500,000 birds. [Note: although a copy of the 6 March 1991 letter is on file in Seychelles, the original letter never reached C. Feare.] The information gathered in 1990–91 thus indicates a population two orders of magnitude greater than previously thought (Diamond & Prŷs-Jones 1986). In fact, the Grand Ile rookery has never been visited by an ornithologist during the nesting season, and earlier reports of nesting (Rivers 1878, Vesey-Fitzgerald 1941) do not mention rookery size.

During the 1920s and 1930s, yolk from millions of eggs was barrelled each year (using salt or boric acid as a preservative) and exported from Seychelles to Europe and America. An unknown proportion of those eggs came from Cosmoledo which was leased by the same individual who controlled the egg harvest in the Amirantes (Ridley & Percy 1958). Feare (1976) has suggested that eggs barrelled on the remote

atolls of Cosmoledo and Farquhar may have contributed significantly to the huge egg crop of the 1920s and 1930s reported by Ridley & Percy (1958).

**LITTLE TERN** *Sterna albifrons*

Reported by Bayne *et al.* (1970).

**CRESTED TERN** *Thalasseus bergii*

Encountered on numerous occasions in December 1996 standing on sand banks and shallow water along shorelines. It was also reported by Parker (1970), Gillham (1977), and Skerrett (1996). May breed on Cosmoledo (Skerrett 1996) as on Aldabra (Diamond and Pr  s-Jones 1986).

**BROWN NODDY** *Anous stolidus*

Nests regularly at Ile du Sud-Ouest (AC pers. obs.), where Skerrett (1996) found 20 pairs with eggs in April, and JAM recorded more than 100 adults on a limestone shelf on the north shore in late January 1982. Vesey-Fitzgerald (1941) reported nesting on islets in the lagoon, and claimed that in much of Seychelles breeding occurs year-round, with a peak during the south east monsoon (April–October) which coincides with peak nesting by *S. fuscata*. Elsewhere, the two species often share a rookery, with *A. stolidus* occupying the perimeter of the closely packed *S. fuscata* colonies but not at Cosmoledo (A.C.). At Aldabra, where *S. fuscata* does not nest, Diamond & Pr  s-Jones (1986) reported that most egg-laying by *A. stolidus* occurs between September and March, and rarely in other months. Occurrence at Cosmoledo was also reported by Parker (1970).

**WHITE TERN** *Gygis alba*

At least eight birds recorded by JAM on Ile du Sud-Ouest in January 1982; also reported by Parker (1970) and Benson (1970).

**MADAGASCAR TURTLE DOVE** *Streptopelia picturata*

First reported in 1878 by Rivers (1878), and later by Bergne in 1901 (see Benson 1970), it was last seen by Dupont (1907) in 1907 and was presumed extinct by Benson (1970). In 1982, a population, apparently *S. p. coppingeri* as on Aldabra, was rediscovered on Ile du Sud-Ouest by Mortimer (1984b). We found the species to be more widespread on that island in December 1996 than was previously reported by Mortimer. Nevertheless, it is apparently restricted to Ile du Sud-Ouest, despite efforts by the junior author (AC) to introduce trapped specimens to Menai in the late 1980s.

**BARRED GROUND DOVE** *Geopelia striata*

Reported by Benson (1970) and Bayne *et al.* (1970).

**BLUE PIGEON** *Alectroenas sp.*

The “*Pigeon hollandais*” reported by Rivers (1878) at both Astove and Cosmoledo atolls was probably an *Alectroenas*, possibly *A. sganzui* which still occurs at Aldabra.

With no subsequent sightings on record the populations at both Astove and Cosmoledo are probably extinct along with another *Alectroenas* that previously inhabited Farquhar (Stoddart & Benson 1970).

**MADAGASCAR COUCAL** *Centropus toulou*?

Rivers (1878) reported a coucal, possibly *C. toulou* as on Aldabra. But with no subsequent sightings, it is presumed extinct.

**BLUE-CHEEKED BEE-EATER** *Merops superciliosus*

Single birds seen by Gaymer in 1964 and 1965 (reported by Benson (1970)).

**BROAD-BILLED ROLLER** *Eurystomus glaucurus*

One bird reported by Vesey-Fitzgerald (1940).

**MADAGASCAR BULBUL** *Hypsipetes madagascariensis*?

Rivers (1878) reported a bulbul, possibly *H. madagascariensis* as on Aldabra. But with no subsequent sightings it is presumed extinct.

**RED-BACKED SHRIKE** *Lanius collurio*

One bird reported by Benson (1970).

**MADAGASCAR CISTICOLA** *Cisticola cherina*

Very abundant, its occurrence has been documented by Vesey-Fitzgerald (1940), Benson (1970), Parker (1970), Gillham (1977), and Skerrett (1996).

**SOUMANGA SUNBIRD** *Nectarinia souimanga buchenorum*

Its occurrence is described by Rivers (1878), Vesey-Fitzgerald (1940), Benson (1970), Parker (1970), Gillham (1977), and Skerrett (1996). Sinclair & Langrand (1998) consider the Cosmoledo population a race of Abbott's Sunbird (*N. abbotti buchenorum*).

**MADAGASCAR WHITE-EYE** *Zosterops maderaspatana menaiensis*

Reports on the species, which is found on Menai, include those by Vesey-Fitzgerald (1940), Benson (1970), Bayne *et al.* (1970), and Skerrett (1996).

**RED-HEADED FOREST FODY** *Foudia emineutissima*

Diamond (1981) believes this to be the fody reported by Rivers (1878) on Astove, Cosmoledo, and Assumption in 1878. It still occurs on Aldabra, Comores, and Madagascar (Benson 1967) but is probably extinct at the other localities.

**PIED CROW** *Corvus albus*

Occurs in small numbers at Cosmoledo, nesting on Menai in the mangroves and on Ile du Nord in Casuarina *Casuarina equisetifolia*. Early reports of its existence on Cosmoledo in 1878 (Rivers 1878) and on Astove atoll in 1836 (Stirling 1843) indicate

that it arrived without human assistance. Moreover, is known to have subsequently gone extinct on Astove and later to be seen recolonizing unaided (Pryŝ-Jones *et al.*, 1981). Other reports on Cosmoledo include Vesey-Fitzgerald (1940), Benson (1970), Parker (1970), Bayne *et al.* (1970), and Skerrett (1996).

## Human impacts

Since the mid-1800s Cosmoledo has been exploited for fish, turtles, sea birds, and molluscs, with up to four human settlements operating at a time (two on Menai and fishing camps on Grand Ile, Grand Polyte, and Ile du Sud-Ouest). Census statistics (Seychelles National Archives) record populations of <10 men during 1850–1900, and 8–58 people (28% women) during this century. Since 1980, the atoll has been owned and operated by the parastatal company, Islands Development Company (IDC). IDC installed a cold store on Grand Ile in the late 1980s to facilitate collection of Sooty Tern eggs for shipment to Mahe; however, the venture proved unprofitable, due to the expense of travelling the 1,045 km between Cosmoledo and Mahe and to breakage of eggs in the rough seas of the south east monsoon. IDC withdrew its personnel from Cosmoledo in 1992. Unfortunately, since then, the atoll has suffered incursions by unauthorized fishing vessels from Seychelles and Madagascar which harvest turtles, birds, sharks, reef fishes and sea cucumbers (JAM and AC, pers. obs.).

Feral cats were reported on Grand Ile by Bayne *et al.* (1970) where Gillham (1977) found them to be serious predators of *S. dactylatra*. In the early 1980s, cats were present on both Grand Ile and Menai. Rumours that they have since spread to Grand Polyte are supported by the decline in numbers of nesting boobies that we observed on Grand Polyte between 1982 and 1996. Rabbits were introduced to several of the smaller islands prior to 1907 (Thomasset 1907) and to Menai in the mid-1980s by AC. They still occur at least on Ile du Sud-Ouest and Menai. Rats (*Rattus* sp.), present on many islands in the group including Grand Polyte, Grand Ile and Menai, but not Ile du Sud-Ouest (AC pers. obs.), appear to be of the same species (*Rattus rattus*) that occurs on Aldabra, but their identity needs verification. Goats (*Capra hircus*) were introduced during the 1800s (Thomasset 1907), still occurred on Ile Nord-Est as late as 1960 (Piggott 1969) but no longer occur. Some of the pigs (*Sus domesticus*) released on Menai in 1986 were still alive in 1997, having survived on a diet of turtle eggs (JAM pers. obs.) and mangrove crabs (AC pers. obs.). Earlier this century, guano was collected from the west end of Ile du Sud-Ouest, and from Ile du Nord and Ile Nord-Est. In 1901, H.A.C. Bergne estimated that 120 tonnes had been removed from Ile Nord-Est and that 300–400 tonnes remained (in Bayne *et al.* 1970).

In the early 1980s, the resident fishermen took juvenile Red-footed Boobies for food on rare occasions (JAM pers. obs.), using sticks to knock them off their roosts. More commonly, however, they would harass Masked Boobies on the ground in much the same way the frigatebirds do in the air. By running noisily through the rookery early in the morning, the fishermen frightened the birds into disgorging their

last meal (flying fish, squid, and other small fishes) which they collected for use as fishing bait—a practice first reported by Vesey-Fitzgerald (1941). The crews of unauthorized fishing boats appear to be more destructive. In December 1996, we found several recently killed *S. sula* on the beaches of Grand Ile and Grand Polyte; ten years earlier, AC found a sack containing some 40 dead *S. sula*.

## Management Recommendations

Although some of its bird populations have suffered declines, Cosmoledo certainly has the largest remaining colonies of *Sula dactylatra*, and possibly also *Sula sula* remaining in the Indian Ocean (Feare 1984, Rocamora & Skerrett in press). Those on Ile du Sud-Ouest have been particularly well preserved, perhaps due to the rough terrain of that island and the lack of rats. We consider its terrain, which comprises uplifted coral limestone almost unweathered in appearance, to be the most difficult for walking of any in the outer islands—a sentiment shared by Piggott (1969). In addition to its extraordinary bird populations, the atoll hosts the second largest Green Turtle *Chelonia mydas* nesting population in Seychelles after Aldabra (Mortimer, 1984a), a significant Hawksbill Turtle *Eretmochelys imbricata* rookery, important foraging habitat for both Green Turtles and Hawksbills, and exceptional coral reefs fringing the outside of the atoll. We believe that Cosmoledo would best be managed as a nature reserve, a view previously expressed by Piggott (1969), Gillham (1977), and Skerrett (1996). In fact, in the late 1960's, when the lease for Aldabra was passed to the Royal Society, Christopher Cadbury offered to buy Cosmoledo (which came up for sale) on behalf of the international conservation community (Skerrett 1996). To discourage poaching of birds, turtles and other marine life, however, personnel would need to be permanently stationed on the atoll. This would be prohibitively expensive given the isolation from both Mahe and Aldabra, and these anticipated costs undermined general support for Mr Cadbury's offer. Nevertheless, the atoll also has the potential to serve as a spectacular dive destination and tourist attraction, the operation of which (if handled properly) might defray some of the costs involved in protecting the wildlife. Eradication of cats and rats could be easily achieved given the limited land area, and can be expected to benefit the bird populations.

## Acknowledgements

Adrian Skerrett provided the inspiration for this study by encouraging JAM to record observations on the birds of Cosmoledo. We are grateful for field assistance provided by Daniel Letourdie and the captain and crew of the yacht *Adelie* in December 1996, and by the captain and crew of the Seychelles Fishing Authority vessel *L'Amitie* in April 1997. We thank Glenny Savy (Executive Chairman, IDC) for permission to visit the atoll and for logistical support, and Justin Moustache (Operations Manager, IDC) and Selby Remie (Division of Conservation) for historical information about the atoll. Helpful comments on the manuscript came from Adrian Skerrett, Chris Feare, Robert Prÿs-Jones, Gerard Rocamora, and Steve Parr. Nirmal Shah (Country Director, BirdLife Seychelles), Clive Hamblen and David Steadman helped procure pertinent scientific literature. Office support was provided by the Division of Conservation of the Seychelles Ministry of Environment, BirdLife Seychelles and Caribbean Conservation Corporation. This study was conducted during a marine turtle survey of the outer islands of Seychelles under the EMPS J1: Turtle and Tortoise Conservation project funded by the Seychelles Government and the Global Environment Facility (administered by the World Bank).

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